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☐ Theory ☒ Experiment

Experimental studies of beam deflection through an exploding foil plasma , J. D. MOODY, B. J. MACGOWAN, R. K. KIRKWOOD, D. S. MONTGOMERY, R. L. BERGER, D. E. HINKEL, T. D. SHEPARD, AND E. A. WILLIAMS, *Lawrence Livermore National Laboratory, Livermore, CA**—We measure the deflection of a Nova laser beam through an exploding foil (6500 Å polyimide) plasma. These experiments isolate the beam steering effect of the window plasma present in gas-filled hohlraum symmetry experiments. Five Nova beams at 351 nm and 12 kJ total energy are incident on the foil at 50 degrees from the target plane normal. Deflection of one beam is determined by measuring the location at which this beam strikes an f/2 scatter plate placed 2 meters from the target. The beam is reduced in aperture to f/8 (all other beams are f/4.3) to increase the significance of the angular deflection. We find that without a random phase plate (RPP) the transmitted beam spreads to about f/4 and deflects from 3 to 6 degrees away from the target normal. Beam deflection is observed above an intensity of about $2 \times 10^{14}\,\mathrm{W/cm^2}$ and increases with higher intensity. RPP smoothing suppresses beam deflection even at the highest irradiances ($1.5 \times 10^{15}\,\mathrm{W.cm^2}$). We will present the observations and discuss the effects which may explain the observations.

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